

# INDIAN DYESTUFF INDUSTRY AND GLOBAL OPPORTUNITIES

## WHITE PAPER

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# Cygnus

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## CONTENTS

1. Introduction .....	34
2. Global Dyestuff industry .....	45
2.1 Overview .....	45
2.2 Major markets .....	45
2.3 Impact of regulations .....	56
2.4 Issues and Challenges .....	6
2.5 Future outlook .....	67
3. Applications and Technologies .....	78
3.1 Types of Applications .....	78
3.2 New applications of dyes in Textile industry .....	78
3.3 Emerging technologies: New frontier in colorant industry .....	8
4. Overview of Dyestuff Industry in India .....	10
4.1 Introduction .....	10
4.2 Structure of the industry .....	10
4.3 Usage pattern and demand .....	11
4.4 Export-Import .....	12
4.4.1 Export growth .....	12
4.5 SWOT Analysis .....	13
4.5.1 Strengths .....	13
4.5.2 Weaknesses .....	13
4.5.3 Opportunities .....	13
4.5.4 Threats .....	14
4.6 Conclusion .....	14
5. Indian Dyestuff Industry - its global competitive advantage .....	15
5.1 Market size and Major Players .....	16
5.2 Competitive Advantage .....	17
5.2.1 Regulations .....	17
5.2.2 Labour .....	17
5.2.3 Raw material .....	18
5.2.4 Other supporting factors .....	18
5.2.5 Opportunities and scope .....	18
6. Strategies for Global competitiveness .....	20
6.1 Conclusion .....	21

## 1. Introduction

Dyestuff sector is one of the core chemical industries in India .It is also the second highest export segment in chemical industry. The Indian dyestuff industry is made up of about 1,000 small scale units and 50 large organized units, who produce around 1,30,000 tonnes of dyestuff. Maharashtra and Gujarat account for 90% of dyestuff production in India due to the availability of raw materials and dominance of textile industry in these regions. The major users of dyes in India are textiles, paper, plastics, printing ink and foodstuffs. The textiles sector consumes around 80% of the total production due to high demand for polyester and cotton, globally. At present, India contributes about 6% of the share in the global market with a CAGR of more than 15% in the last decade . The organized players contribute about 65% of the total dyestuff production in the country. The dyestuff industry has recently seen movement towards consolidation and as a result, organized players are now poised to take a lead in the global market. Small units (around 1000) that exist today still compete in the segments where price realization is lower and the competition severe. Large and organized players (around 50) are gearing up for global competitiveness leveraging technology, product innovation and brand building. Increased focus is being laid on environmental friendliness and at the same time the industry is ensuring greater customer focus through technical services and marketing capabilities, in order to face global competition.

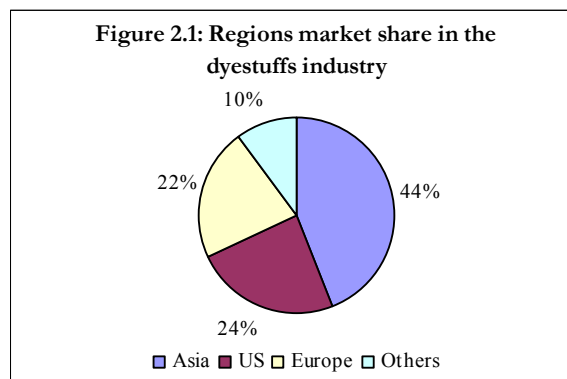
## 2. Global Dyestuff industry

### 2.1 Overview

Globally the dyestuffs industry has seen an impressive growth. Initially the industry's production bases were mostly in the west, but in the last few years, they have been shifting to the East. Dyestuff can be used for Printing inks, plastics, textiles, paper and foodstuff. The world consumption for dyestuff accounts for printing inks at 40%, paints 30%, plastics 20% and others from segments like textiles. The global market size is estimated at USD23 billion in 2005, and India's share in the world market is estimated to be 5-6% as compared to China's share of 25%. The market has reached this stage by facing many challenges in production and demand, regulations and changing customer preferences. In future, the market for dyestuffs is likely to grow more.

### 2.2 Major markets

China, Taiwan, India, Japan, Korea and Pakistan are the major dyestuff producing countries in the industry. In terms of market share, Europe is the leading producer due to its allegiance towards specialty products and the countries in Europe have remained the largest players owing to specialty products (Figure 2.1).

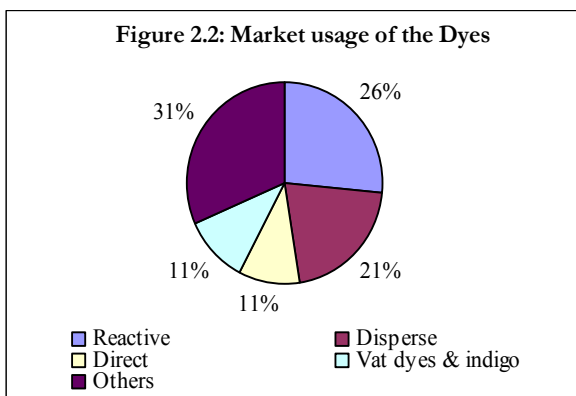


Source: India Infoline

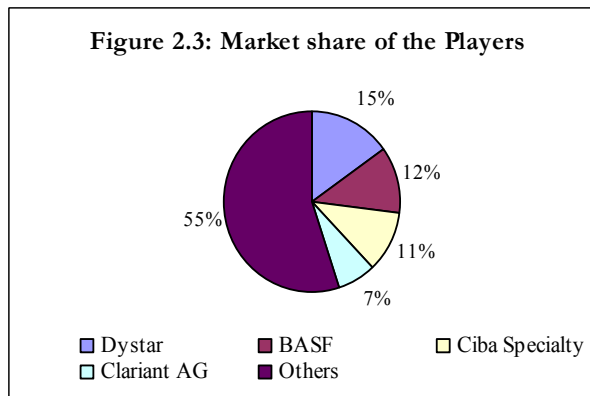
In volume terms, global production of dyestuff industry is estimated to be at 34 million tonnes. The dye markets are mostly dominated by reactive and disperse dyes (Figure 2.2). The demand for reactive and disperse dyes is expected to grow in future as these two dyes are dominant in all the regions. The demand for reactive and

disperse dyes are common in all the regions whereas disperse vat and other dyes are stagnant. In the Asian region, China, Korea and Taiwan are strong players in disperse dyes, while India leads in the production of reactive dyes due to an availability of intermediate vinyl sulphone in the country.

The leading players in the global market are Dystar, BASF, Ciba Specialty and Clariant AG and the market share of these players is depicted in Figure 2.3.



Source: India Infoline



Source: DMAI

### 2.3 Impact of regulations

The impact of regulations depends on macro and micro economic activities of the country. Some of the recent regulations affecting the industry are:

The European legislation has plans to implement Registration, Evaluation and Authorisation of Chemicals (REACH) by 2007 to ensure the protection of human health and environment. The chemical exporters should have the required regulatory data to sustain the exports to the EU countries. The industry should try to set up Good Lab Practices (GLPs), which will help in creating safety data for the products, and also provide opportunities for outsourcing of services in the industry. In a country like India, the tax burden on the products is very high which amounts to 40%.

## 2.4 Issues and Challenges

Though not globally, but the dyestuff industry in some of the regions has more challenges upfront rather than the issues. The challenges are:

- *Falling margins with over capacity:* Though countries like China and India have high potential in the production capacity due to a shift in manufacturing base from Europe and some other developed nations, but the demand across these regions is varying and this causes volatility in the market affecting the prices.
- *Intense competition:* The companies' move from West to East has encircled all the companies in the Asian region and has created fierce competition in the global market.
- *R&D:* Despite a constant R&D spending across all the manufacturers of 1-3%, the market is demanding a higher spending for product innovation like natural dyes.
- *Environmental friendly:* The industry can shine only if the dyes are environmental friendly and protective. One of the examples was the banning of the Azo dyes in Europe and the closure of their units. Like wise in most of the countries there are plenty of dyes that were banned and all the inclination is now towards the usage of natural dyes.
- *Government and trade association support:* For any industry to move ahead there is always a back-end support of the government and trade associations in promoting that industry in other countries, allocating investments and providing other support. These associations should promote technology institutes in the line of research activities.

## 2.5 Future outlook

The growth of dye sector in the future continues to depend on the performance of end user industries like paints, textiles, printing inks, paper, plastics and foodstuffs. The changing customer preferences, boom and expansion of infrastructure in certain parts of the world creates new market opportunities for the dye industry. The industry is likely to see many new dyeing technologies coming into the market with the help of good technical expertise and R&D achievements.

Globally the high usage of cotton, polyester and the banned vat and Azo dyes in some of the countries has paved the way for reactive and disperse dyes. It is expected that in future these two dyes would lead the market.

Some segments will perform much better than the group as a whole such as colorants for toners and laser printers which are expected to grow with an impressive rate of 10% per annum, while the segment as a whole languishes.

### 3. Applications and Technologies

#### 3.1 Types of Applications

Dyes are largely used by the textile industry, accounting for around 80% of consumption in India. In addition to textiles, dyes find applications in other industries like plastic, paints, printing inks, food processing, paper and leather. While these industries account for a very small part of domestic consumption, but globally they account for a substantial part of total consumption. According to the US International Trade Commission, various applications of dyestuff are given below in table 3.1.

Group	Applications
Acid	Wool, silk, paper, synthetic fibres, leather
Azoic	Printing Inks and Pigments
Basic	Silk, wool, cotton
Direct	Cotton, cellulosic and blended fibres
Disperse dyes	Synthetic fibres
Reactive	Cellulosic fibre and fabric
Organic pigments	Cotton, cellulosic, blended fabric, paper
Sulphur	Cotton, cellulosic fibre
Vat dyes	Cotton, cellulosic and blended fibre

#### 3.2 New applications of dyes in Textile industry

With a shift in consumer taste from synthetic fibres to high quality cotton, the consumption pattern of dyes has also been changing. The higher cost of synthetic fibres, rising quality demands and higher environmental awareness has revived the demand for cotton and thus application of vat dyes.

Globally, vat dyes account for 15% of total textiles dyes. These are mainly used for high fastness requirements such as works wear, furnishing fabrics, uniforms and terry towelling. They are also widely used in fashion and sportswear.

### 3.3 Emerging technologies: New frontier in colorant industry

The conventional dye manufacturing processes are extremely polluting. Most of the international manufacturers have transferred the technology to developing nations like China, India, Indonesia, Korea, Taiwan and Thailand as the industry is considered to be high cost with low returns. Therefore, the focus of the dyeing industry has now shifted on improving cost efficiency and minimizing the use of environmental unfriendly reducing agents. Some of the emerging technologies in dyeing industry have been discussed below.

**Electrochemical Dyeing:** The most recent development in this regard is the electrochemical dyeing. In this process, the chemical reducing agent is replaced by an electric current. This completely eliminates the use of substances that pollute effluent and at the same time improves the efficiency and quality of the dyeing process.

**Low Temperature Dyeing (LTD) Technology:** LTD technologies are cost-effective dyeing techniques that damage wool fibres less than conventional methods with lengthy boiling, resulting in a stronger dyed wool. For example, CSIRO's Sirolan-LTD. Sirolan-LTD can be used in either of the two ways, i.e by dyeing at a temperature below the boil, or by dyeing at the boil, but for a much shorter time than in conventional dyeing.

**New Dye Sublimation and Heat Transfer Technology:** Dye sublimation is a dye-transfer process that started in the 1960s for use in textiles. In this transfer process when the dyes are heated, they vaporize and the vapours penetrate the adjacent substrate (such as a plastic or coating) by around 0.002-0.25 of an inch. The plastic substrate must be able to withstand temperatures of 280-375°F necessary to vaporize the dye. In recent years, the dye sublimation has advanced to provide wear-resistant,

full-colour surface decoration of flat objects like mouse pads and tiles, and even more recently, it has been proved applicable to three-dimensional products. Kolorfusion International, Inc. holds the process patents for the 3D decorating technology.

## 4. Overview of Dyestuff Industry in India

### 4.1 Introduction

The dyestuff industry constitutes an important segment of the chemical industry in India. The Indian dyestuff industry is today totally self-sufficient with a majority of its inputs manufactured locally. India is currently producing all varieties of synthetic dyestuffs and intermediates and has a small presence in the natural dyestuff. The subcontinent has emerged as a global supplier of dyestuffs and dye intermediates, particularly for reactive, acid, vat and direct dyes.

The dyestuff industry in India is mostly located in Gujarat and Maharashtra. Gujarat comprises of more than 1200 small scale industrial and factory sector units. There are about 158 large scale projects involving an investment of INR14.06 billion which have been commissioned / concluded. The dyestuff industry in Gujarat substantially contributes in production as well as to the domestic consumption and export basket of the country's target.

### 4.2 Structure of the industry

The small scale units account for a majority of dyestuff production while large units dominate manufacturing of dyestuff intermediates. The installed capacity of the dyestuff and intermediates industry for selected group is estimated at about 55,000 MT per year as detailed in the following table (Table 4.1).

Product	2003-2004		2004-2005	
	Actual		Actual Anticipated	
	Installed Capacity	Production	Installed Capacity	Production
Azo Dyes	8.7	3.9	8.7	4.5
Acid Direct Dyes (Other than Azo)	0.2	0.0	0.2	0.0
Basic Dyes	0.5	0.1	0.5	0.0
Disperse Dyes	6.3	1.2	6.5	1.1
Fast Colour Bases	0.6	0.0	0.6	0.0

Table 4.1: Installed Capacity and Production				
	2003-2004		2004-2005	
	Actual		Actual Anticipated	
Product	Installed Capacity	Production	Installed Capacity	Production
Ingrain Dyes	0.3	0.2	0.3	0.3
Oil Soluble Dyes (Solvent Dyes)	1.6	0.0	1.6	0.0
Optical Whitening Agents	1.1	0.3	1.1	0.3
Organic Pigment Colours	12.3	11.3	12.3	13.3
Pigment Emulsion	6.4	2.4	6.4	2.5
Reactive Dyes	6.2	2.3	6.2	2.7
Sulphur Dyes (Sulphur Black)	3.3	2.9	3.3	2.4
Vat Dyes	2.9	1.0	2.9	1.1
Solubilised Vat Dyes	0.1	0.0	0.1	0.0
Food Colours	0.1	0.0	0.1	0.0
Nepthols	3.5	0.5	3.6	0.5
<b>Total</b>	<b>54.1</b>	<b>26.1</b>	<b>54.4</b>	<b>28.7</b>

Source: iNDEXTb report

The main products on which the small-scale manufacturers concentrate are reactive dyes, acid dyes, and direct dyes, while large companies mainly concentrate on vat, disperse and pigment dyes. Disperse and Reactive dyes constitute the largest product segments in the country constituting nearly 45% of dyestuff consumption. In future it is expected that both these segments will dominate the dyestuff market with Disperse dyes likely to have the largest share followed by reactive dyes on account of dominance of textile and synthetic fibres in dyestuff consumption. Vat segment is also expected to record a positive growth in future

#### 4.3 Usage pattern and demand

The market for dyestuff is dependent on textiles, in particular demand for polyester and cotton determine the demand for certain types of dyestuffs. The textile industry is currently buoyant and the market is growing steadily. There is a shift in the usage of polyester and polyester blended fabrics and as a result demand for disperse dyes are at a peak. Due to adverse conditions in the textile industry, the demand for vat dyes was

affected but it has brilliant fastness property and as a result its demand in future is expected to continue. Reactive dyes are expected to grow at a CAGR of 6-8% by the end of 2006-07.

#### 4.4 Export-Import

India's dyestuff industry has now emerged as a very strong industry and as a major foreign exchange earner. The exports of dyestuffs in the year 2000-01 accounted for nearly 5% of the total world trade of dyestuffs. Major markets for Indian dyestuffs are the European Union, U.S.A., Indonesia, Hong Kong, South Korea and Egypt.

The following table (Table 4.2) gives an insight into the export and import of dyestuff during the last few years (FY01 to FY04).

Rs. in Crores				
Items	2000-01	2001-02	2002-03	2003-04
Export	2,365	2,437	2,943	3,112
Import	878	1,138	1,345	1,617

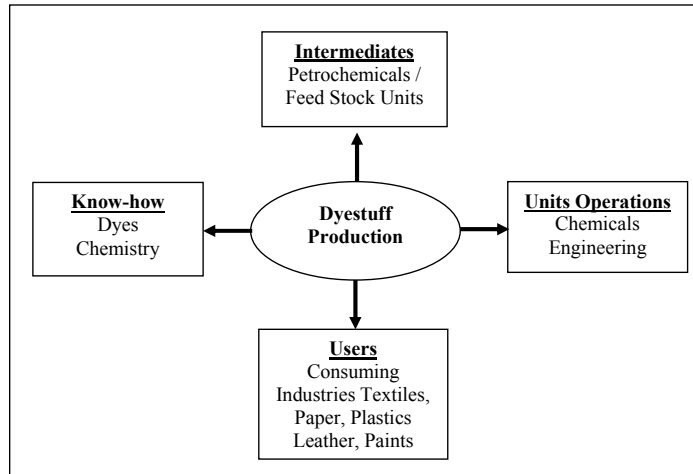
Source: various reports; Cygnus Research

##### 4.4.1 Export growth

Over the last 15 years the Indian dyestuff industry has established itself in the export arena and among the various types of dyes exported, export of reactive dyes accounts for the largest share and growth. In the recent past Indian dyestuff industry has been facing competition from China, Korea, Thailand, Taiwan and Pakistan. Industry experts believe that dyestuff industry in India can be a real force to reckon with in exports and in 2009-10 its exports may increase up to INR121.77 billion accounting for nearly 10% of the world's market share.

## 4.5 SWOT Analysis

### DYESTUFF INDUSTRY INTERLINKAGES



#### 4.5.1 Strengths

- Some consolidated units are power packed with size of production
- Ready availability of feedstock
- High degree of entrepreneurship
- Matured chemical industry

#### 4.5.2 Weaknesses

- Per capita consumption is still poor compared to international standards
- Infrastructure facility has to be improved a lot
- Finances for industries are not patronised much by FIs
- Outdated technology in many small and medium size units
- Lack of awareness in R&D and willingness for investment
- Marketing practices do not conform to international standards in most of the cases

#### 4.5.3 Opportunities

- Constant technology up gradation to provide value added products
- Enhanced quality of products at reduced prices
- Improve economies of scale

- Product and service differentiation
- Develop world class Infrastructure
- International trade procedures to be implemented
- Build Indian brand image overseas
- Developed countries are looking at outsourcing dyes from developing countries due to more and more production facilities are being shifted to Asian countries like India and china

#### 4.5.4 Threats

- Pollution control is strictly monitored and can make closure of units in the event of non conforming to pollution norms set by designated authorities
- High costs of interest and energy
- The Indian industry is facing stiff competition from China in the international market

#### 4.6 Conclusion

The Dyestuff industry in India has realised that in order to maintain in the market, an application of modern technologies is required and at the same time international marketing is to be adopted like the other global players. A significant change in the industry was noticed and as a result consolidation happened as a result some large MNCs also showed their interest in the process. However, there is a need for renewed focus on the right product profile and as a result higher investment in research too needs to be realised. The economies of scale have also become important for spreading costs of manufacturing. But there is no doubt that capability in making continuous investments in R&D will make a difference in the industry.

## 5. Indian Dyestuff Industry - its global competitive advantage

The dyestuff sector of India is self sufficient in raw material supply with 95% of the raw material requirement being fulfilled locally. Availability of raw material has made India a dream investment destination. The major domestic markets are Rajasthan, Gujarat, Maharashtra, Tamil Nadu, Haryana, Uttar Pradesh and Coimbatore where as the overseas markets are Europe, the USA, Indonesia, HongKong, South Korea, Egypt and Africa. But due to the environmental norms, more number of small scale companies is being closed down or are merged with the bigger players. Some of the M&A and restructuring initiatives are discussed in Table 5.1.

**Table 5.1: Major strategic/restructuring initiatives in Dyestuffs industry**

<b>Year</b>	<b>Formation</b>	<b>Activity</b>
1995	Clariant	The spin off of Sandoz Chemicals division
1997	Hoechst's Specialty Chemicals business	Integration of Hoechst's specialty chemicals business
-	Ciba Specialty	Spin off of the dyestuffs business of Hindustan Ciba-Geigy
-	Dystar (India)	Bought the dyes business of Color-Chem
FY03	Indo Swiss Chemicals	Joint venture of Ciba Specialty Chemicals and Indian Dyestuff Industries.
FY03	Pigment Specialties India	Ciba Specialty Chemicals
-	Atic Industries and	Atul has purchased Zeneca's stake and merged into Atul Limited
-	Cibatul	Atul has purchased Ciba Specialty Chemicals and merged into Atul Limited

*Source: DMAI*

India has become a major player in the export of reactive, acid and vat dyes. In India, SSIs focus on the production of acid, basic, direct and reactive dyes as these are economical whereas big companies concentrate on vat, solvent and disperse dyes.

Dye Manufacturers Association of India has submitted the strategic action plan for Dyes & Dye intermediates industry 2001-2010, and has suggested export strategies like local offices, market study in the potential areas and direct communication with the buyers, organizing exhibitions and events in the respective areas. The market for reactive and disperse dyes will be preferable in the market due to the high usage of

cotton and polyester fabrics. On the other hand reactive and vat dyes have light fastness and wash fastness properties for export and the potential for Azo free dyes has increased after the ban in Germany and other European countries.

### 5.1 Market size and Major Players

The market size of the Indian dyestuff industry is INR141 billion including the exports of INR52 billion in 2004-05. The exports doubled from INR26 billion 2000-01 to INR52 billion in 2004-05 (See Figure 5.1). By 2010, the exports are expected to reach INR121 billion. India currently produces 130,000 tonnes and 75% of the production is exported to 15 countries like: the USA, Germany, Netherlands, Italy, UK, Spain, Turkey, Switzerland, Indonesia, Korea, Hong Kong, Thailand, Singapore, Japan and Taiwan.



Source: Chemexcil and DMAI

The per capita consumption is very low 50gm compared to the world average of 400 gm. Textile, cotton and polyester consume more dye compared to the other fabrics and in turn the growth of disperse, direct and reactive dyes will increase due to the usage of these intermediates in cotton and polyester. In future, the contributions for disperse dyes will be more followed by direct dyes and reactive dyes. By 2010, the contribution of India in the global dyestuff market will reach 8-10% with an increase of 20% per annum.

The major players in the organized sector are Atul Products, Jaysynth Dyechem, Meghmani Organics, Colortex, Sudarshan Chemicals, Colour Chem, Ciba Speciality, BASF, Clariant India, IDI and Metrochem. The Indian companies account for 6% of the world dye production.

## 5.2 Competitive Advantage

### 5.2.1 Regulations

In the evolutionary process, the Government of India reduced tariff, interest rates and local sales tax.

- *Reduction in import and export duties:* The Government has reduced the import duty from 35% to 25%.
- *Promotional activities:* DMAI has suggested the government to grant INR2-2.5m to them so that they take the responsibility to choose and send the best of the industry to the potential markets in promoting the Indian brand.
- *Flexible Visa facilities:* The industry suggests an easy access of visa facility for the delegates to improve industrial growth.
- *Reduced Interest rates:* The interest rates of banks for exports have decreased to 7.5% in 2004 from 11% in 2001.
- *Local sales tax:* The local sales tax has decreased to 4% from 10% in order to be price competitive in the global market.
- *Indian Eco mark:* In most of the countries, the textile products are given the label that follow the eco-friendly constraints laid by the government and one of them is the kind of dye that is utilized in the process. India has introduced this Eco mark in 1991.

### 5.2.2 Labour

India has trained managerial & plant personnel with entrepreneurship skills including five decades of experience in the industry.

### 5.2.3 Raw material

Though the cost of the raw materials is 50% of the production cost, but the existence of all the raw materials is located in proximity at plant locations like Maharashtra and Gujarat. An additional cost-effective factor benefit is the reduction of import duties that would decrease the raw material cost.

### 5.2.4 Other supporting factors

Some of the other supporting factors in the Indian dyestuffs market are the 100% FDI permission and the matured chemical Engineering industry that is attracting most of the MNCs with the benefit of producing low end products. This will assist the other industry players in the adoption of technology and processes into their systems.

The environment protection challenges was solved with the formation of centralized effluent treatment plants from the government, which will reduce the closure of small and medium scale industries and create a competitive environment and also increase the investment limit of INR10m to INR50m.

### 5.2.5 Opportunities and scope

As India has become one of the leading exporters of dyestuff, its responsibilities in terms of quality of products at competitive prices, economies of scale, product and services differentiation, world class infrastructure, technology upgradation, implementation of international trade procedures and brand building, have increased.

- *Economies of scale:* Due to five decades of expertise in the dyestuffs industry, players operating in the field must adopt economies of scale to compete with other countries.

- *Technology up gradation:* Technology is the key to manufacturing and the Indian industry is fragmented with very few players handling the organized sector that is expected to grow.
- *Quality of Products at competitive prices:* The Indian manufacturers have to concentrate on the quality of products at competitive prices in order to compete with leading countries like China, Japan, Indonesia and HongKong. The developed countries production share in the market has reduced from 65% to 50% and is expected to further reduce in the future.

The adoption of technology will increase the quality of products and production.

- *World Class Infrastructure:* As ports and roads are the main sources of transport, the Indian government is emphasising to improve the clearance of the goods at a faster rate.
- *Products and services differentiation:* The declined growth for products has moved the manufacturers to emphasise on specialty products.
- *Brand building:* The major composition of the players from small and medium scale companies lacking the product and services promotion in turn pulled in the organized players for technical services, distribution and marketing concepts.
- *Need to reduce high cost of interest and energy:* The high cost of interest is lowering the investment in R&D which is the core ingredient for product and service innovations. The high energy cost has also adversely affected the manufacturing unit.
- *Product Innovation:* Globally the demand for natural dyes is increasing. In India, even though the research activities are active, it has to be aggressive enough to compete with China and Japan. In December 2005, the Bangalore-based Central Sericulture Technological Research Institute (CSTRI) has found natural dyes for the silk industry. The natural sources being neem and amla.

## 6. Strategies for Global competitiveness

With a high production capacity in India, the government and Industry associations have started putting emphasis on exports. To be competitive in the global markets, the industry has to adopt various strategies like:

- *Industry watch:* The oversupply of dyes is impacting the prices and to be competitive, the industry associations must keep a track on the customer needs and production.
- *Support of Financial institutions:* The support of Financial institutions can decrease, many of the challenges faced by the industry like a lack of R&D investments, advanced technology and high credit period to the customers
- *Advanced technology:* The core for any manufacturing set up is the technology, and the dyestuffs sector is also demanding an advanced technology setup in order to improve its operations performance.
- *R&D:* Awareness programmes and Government assistance needed to develop the new products and services with investments in R&D will move the industry ahead. There are many institutes like Central Sericulture Technological Research Institute (CSTRI), Department of textile technology in India that encourage them in the innovation to support a large sum of small scale industries.
- *Brand building:* The promotion of the Indian dye products and companies in the potential markets is vital to push the industry's exports.
- *Specialty products:* A worldwide move from the products to the solutions is fetching the industry players, and India is also slowly shifting its base from commodities to specialty products.
- *Integration:* As the sector is more unorganized, it expects the integration of industry associations, financial institutions and the Government to guide the companies.
- *Investments in the technology institutes:* Encouraging the institutes and laboratories for innovation. For example, the Punjab Agricultural University has invented two plants 'Bisorata' and 'Nutgraff' as natural dyes for cotton, wool

and silk. The government has granted patents to these in August 2006. According to experts, the advantages from these plants are cheaper and cut commercial costs of dyeing of cotton by 70%. Another innovation in the Indian dyestuff industry is the cost reduction in cotton dyeing with reactive dyes which will save the consumption of water from 20,800 to 3,500 litres in turn time, energy and wastewater.

## 6.1 Conclusion

Restructuring of the industry that was initiated a couple of years ago has benefited it in its global competitiveness. Industry majors who opted for consolidation created manufacturing power houses which can go that extra mile in global competition. The ban on Azo dyes in European countries helped the Indian industry to release its potential and perhaps forced it to realize the need for a strong marketing and positioning dyes under their brands to various countries. Today Ciba India and IDI have signed a pact to market polyester and cellulose dyes. IDI has also tied up with Ciba for the manufacture and marketing of dyes and pigments. Atul products has completed the acquisition of Zeneca's 50% stake in Atic Industries Ltd and tied up with BASF, Germany to market 50% of its production of vat dyes. The restructuring of Sandoz, consequent to its merger with Ciba, has led to the creation of Clariant AG. The dyestuffs manufacturing division of Khatau Group has merged with its marketing company, Indokem Ltd. All these alignments will improve capacity utilization and reach the export market.

The world demand for disperse and reactive dyes will increase further and it is true that if the Indian dyestuff industry can invest more in R&D and market their product in direct selling to various textile majors in the world, there will be a day when the whole world would watch the Indian dyestuff industry.